

REMARKS

Claims 1, 3-7, 11, 13 and 14 are presently pending in the application.

Claim 2 has been cancelled and its subject matter incorporated in claim 1. Similarly, claims 8-10 and 12 have been cancelled and their subject matter incorporated in independent claim 6. In view of the cancellation of claim 12, the dependency of claim 13 has been amended to claim 6.

In addition, subparagraph (a) of claim 1 and the second subparagraph of claim 6 have been amended to more clearly define the material and shape of the filtering rings of the claimed invention. These amendments are supported, for example, in the drawings, particularly Figs. 4-6 and 8-10, and in the specification, for example, at paragraphs [0068] – [0070], [0077] – [0078] and [0091]. Further, subparagraphs (d), (e) and (f) of claim 1 have been amended to more clearly describe the fluid flow through the ring lamination and the removal of the solids from the object fluid and from the filtering rings. These amendments are supported, for example, in the drawings, particularly Figs. 4 and 5, and in the specification, for example at paragraphs [0019], [0050], [0059], [0082], [0083] and [0086].

Finally, claims 1, 4-6, 13 and 14 have been amended to overcome the Examiner's rejection under 35 U.S.C. § 112, as discussed more fully below. Accordingly, no new matter has been added, and entry of the amendments is respectfully requested.

The Examiner has rejected claims 1-14 under 35 U.S.C. § 112, second paragraph, as being indefinite in several respects. While not necessarily agreeing that all of the language cited by the Examiner is vague and indefinite, claims 1, 4-6, 13 and 14 have been amended as follows. With respect to claim 1, the filtering rings are now referred to as "adjacent" filtering rings, and the gap distance has now been defined in subparagraph (c), so that it is now clear how the gaps are formed by contact surfaces. With respect to claim 4, it is now clarified that the pressure of the object fluid is "acting on" the inlet area. With respect to claim 5, it is now clarified that the object fluid is pressed radially into the ring lamination and also that the pressure of the object fluid is acting on the inlet area. With respect to claim 6, Applicant has essentially adopted the Examiner's suggestion for rewording of the preamble of the claim.

With respect to claim 12, the subject matter has now been incorporated in claim 6 as the last clause thereof, which now is clarified to state that one of the fractions is removed from the ring lamination by the stripper. In view of the amendment of claim 6 and the clarification “separated”, it is believed that claim 13 is now clear that the solids are part of one of the separated fractions removed from the ring lamination. With respect to claim 14, the interior has been clarified to state that it is an interior of the holder.

In view of the above amendments, it is submitted that the claims now fully comply with the requirements of 35 U.S.C. § 112. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

The Examiner has rejected claims 1, 2, 4-10, 12 and 14 under 35 U.S.C. § 102(b) as being anticipated by Japanese Patent Application Publication No. 10-52608 (“JP ‘608”). The Examiner contends that JP ‘608 discloses a fluid treating apparatus and method comprising the steps of (a) forming a ring lamination by laminating a plurality of ceramic filtering rings with contact surfaces facing each other in a laminating direction and held in a long cylindrical housing; (b) the plurality of ceramic filtering rings inherently having a contact surface roughness in the claimed range and face each other; (c) pressing the ring lamination to cause the contact surfaces to closely adhere to each other at a distance in the claimed range; (d) directing an object fluid into gaps formed by the contact surfaces of adjacent ceramic filtering rings of the ring lamination; (e) dividing the object fluid into first and second separated fractions, wherein the speed of division and separation is controlled by a pump or gate valve pressure source to create a pressure difference between the supply pressure and the second pressure, acting on the inlet and exit areas of the ring lamination; and (f) stripping one of the separated fractions from the filtering rings, including a back washer arranged in a center hole of the ring lamination.

In addition, the Examiner has rejected claims 3, 11 and 13 under 35 U.S.C. § 103(a) as being unpatentable over JP ‘608. Regarding claims 3 and 11, the Examiner acknowledges that JP ‘608 does not disclose the ceramic filtering rings being made of a magnetic material. However, the Examiner argues that it would have been obvious to one skilled in the art to make the ceramic filtering rings of JP ‘608 of magnetic material, because ceramic is often made of

magnetic material, and it was known in the art at the time of the invention to make filtering rings magnetic, to better capture any ferromagnetic material in the treated fluid.

With respect to claim 13, the Examiner acknowledges that JP '608 does not disclose a rotary brush arranged in the center hole of the ring lamination for stripping one of the separated fractions from the filtering rings. However, the Examiner argues that it would have been obvious to one skilled in the art to have the stripping means of JP '608 include a rotary brush arranged in the center hole of the ring lamination, because it is well known for stripping means to include a back washer and a rotary brush.

These rejections are respectfully but strenuously traversed for the reasons set forth in detail below.

At the outset, it is noted that JP '608 is cited and discussed in the Background section of the present application at paragraphs [0012] and [0013], and illustrated in Fig. 11 of the drawings. From this description, it can be readily seen that JP '608 differs significantly from the presently claimed invention.

Thus, the filter device of JP '608 comprises a plurality of porous filter media 1, each having a number of fine pores 2 and a thickness of 0.3mm to 3mm. These media are closely piled on top of one another to form a laminated filter 6, as shown in Figs. 1 and 2. The reference does not disclose the surface roughness of the filter media or the diameter of the pores of the media and, contrary to the Examiner's contention, these are not inherent in the reference.

According to the method of JP '608, a suspension of sewage or wastewater is fed through opening 16 to the outer periphery of the laminated filter 6 and then flows from the outer periphery to the central conduit 3, as shown in Fig. 2. That is, the suspension to be filtered is passed through the gaps between the contact surfaces of the filter media 1, which closely contact each other. The reference does not disclose the distance between the filter media 1.

The filtered liquid of JP '608 is discharged from the laminated filter through conduits 3 and 4, and the particles in the suspension are accumulated on the contact surfaces of the filter media, forming the gaps. The accumulation of the particles on the contact surfaces decreases the

filtering performance of the filter media. Moreover, a stripper in the center hole would serve no purpose in JP '608 because that is the effluent side of the filter in JP '608.

Therefore, according to the invention of JP '608, it is necessary to frequently carry out a so-called "back-washing" operation, which causes a backward flow of the filtered liquid to remove the particles accumulated in the fine pores 2 of the filter media 1, as shown in Fig. 3. When clogging of the porous filter media occurs, the regeneration rate of such backwashing is low, requiring washing with chemicals or replacement of the filter media.

According to the presently claimed invention, the ring lamination 4 is formed by laminating a plurality of filtering rings 3, each made of a flat metal plate having a contact surface roughness (R_a) in a range of about $0.01\mu\text{m}$ to $20\mu\text{m}$. These filtering rings 3 of the presently claimed invention are completely different from the porous filter media 1 of JP '608 in structure, material and shape.

Furthermore, the operation of the fluid treatment method and apparatus of the presently claimed invention is also completely different. Thus, according to the presently claimed invention, the fluid (liquid or gas) suspension is fed to the inner periphery of the ring lamination 4. The first separated fraction (solids) in the fluid suspension, does not pass through the flow channels between the filtering rings 3, but is accumulated on the center hole side (inner periphery) of the ring lamination 4. The second separated fraction (fluid) flows through the gap channels between the filtering rings 3 and flows out of the outer periphery of the ring lamination 4.

The solids adhered to and accumulated on the inner peripheral wall of the ring lamination are scraped off by a stripper (for example a brush 30) toward the downstream side. Thus, the gaps between the filtering rings 3 are prevented from being clogged off by bridging of solids in the gaps.

In contrast, according to JP '608, the solid fraction (suspended particles) in the liquid suspension, flows into the gaps between the filter media 1, together with the liquid fraction, and the solid fraction is adhered to the contact surfaces between the filter media, and are accumulated on the surfaces thereof. These surfaces cannot be reached by a brush or other scraper without taking the laminated filter apart.

It is also clear that JP '608 does not disclose the particular shape of the filtering rings as specified in clause (a) of claim 1 and the second subparagraph of claim 6 of the present claims. Accordingly, the presently claimed invention differs from JP '608, not only in structure, material and function of the filter rings, but also in the shape of the rings.

For all of the above reasons, it is submitted that JP '608 fails to teach or suggest the presently claimed invention. Accordingly, the rejections are improper, and reconsideration and withdrawal are respectfully requested.

In view of the above amendments and Remarks, it is submitted that all of the claims in the application fully comply with the requirements of 35 U.S.C. § 112, as well as patentably distinguishing over the prior art relied upon by the Examiner. Reconsideration and withdrawal of the rejections and an early Notice of Allowance are therefore respectfully requested.

Respectfully submitted,
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WWS/rc
Enclosure – Petition for Extension of Time (two months)